circuitbenders.co.uk - Boss DR110 internal DIN-sync kit.

To start off, we'd suggest that you check you have all the correct parts and read all the way through the guide before beginning work. In addition to the parts supplied you will also need several short lengths of wire plus various drills and tools.

We have tried to make this guide as simple as possible, with as many big photos as we could fit, but feel free to email us at info@circuitbenders.co.uk if something isn't clear.

The kit is shown in the picture below. The actual interface circuitboard is sealed in heatshrink tubing. This is so it doesn't short to anything inside the DR110 when you seal the case up. Theres not a lot of spare room available in there

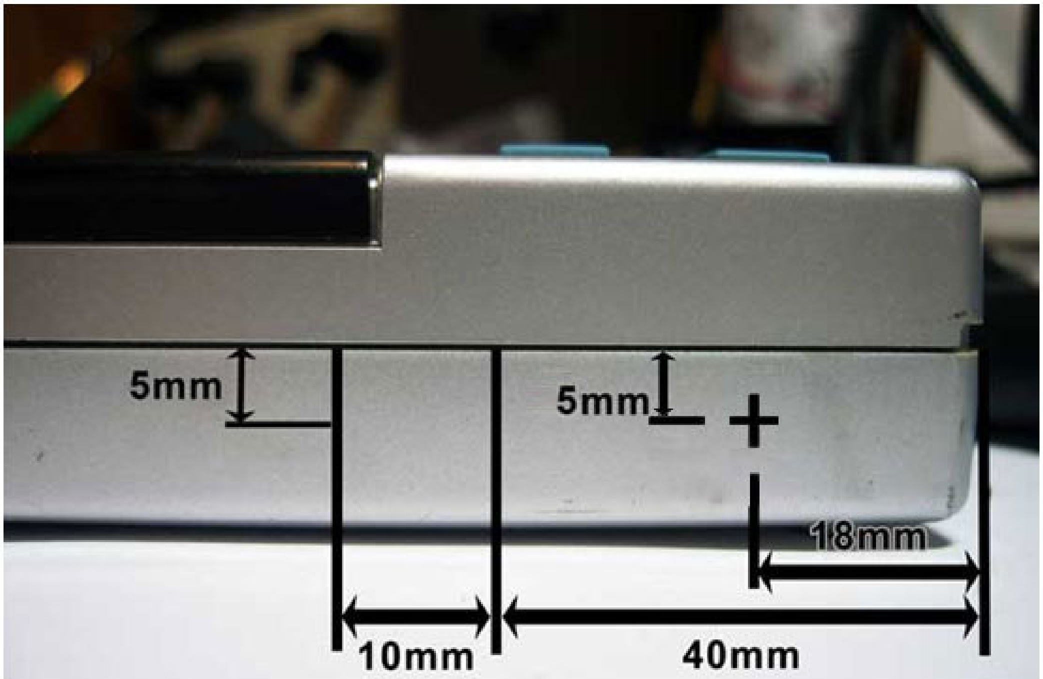


You should have a 5 pin DIN socket with two fixing bolts, a sliding switch with two fixing screws, and the DIN sync interface with the external wiring already soldered onto the board as shown.

Firstly, you need to open up the DR110. To do this you will have to unscrew the three screws on the back, and pull off the four knobs on the front. The casing should then pull apart, but be careful of the clips at the front of the case as it is easy to damage them. You should also take note that as soon as you pull the case apart, the blue plastic on/off switch at the rear will instantly fall out of the case and apparently vaporise. You may think that theres no way it could have possibly disappeared, but these things are unbelievably clever when it comes to vanishing without a trace and they can't be replaced, so take care!

Check there are no obstructions or nasty cracks in the casing to the left of the battery compartment where you will be installing the DIN-sync socket. If it looks good, close up the case again and put the screws back in.

You now need to cut the holes for the DIN socket. You can see the recommended measurements for this in the image on the next page.



This may not make sense immediately but read on and everything will become clear. The 5mm measurements are from the outer edge / lip of the lower casing as shown, not from the top of the inner lip of the casing edge.

First you'll need a way to cut a 16mm hole for the DIN socket. We usually drill a small pilot hole and then use a 16mm hole saw for this, but there are various ways of doing it. However you do it, be very careful as there isn't much room between the casing and the battery compartment. Wildly drilling a 16mm hole with a power drill could end up with a very cracked case and demolished battery compartment. The case needs to be tightly screwed together as you will be cutting both the top and bottom half at the same time.

Once you have the 16mm hole, stick the socket in and line it up so its straight. You can then use the socket mounting holes as guides to drill the bolt holes. We usually use a Dremel tool with a 3mm bit for this. You should end up with something like the image below. Mount the socket **UPSIDE DOWN** using the nuts and bolts provided. It is very important that its upside down, See the next page for pictures.

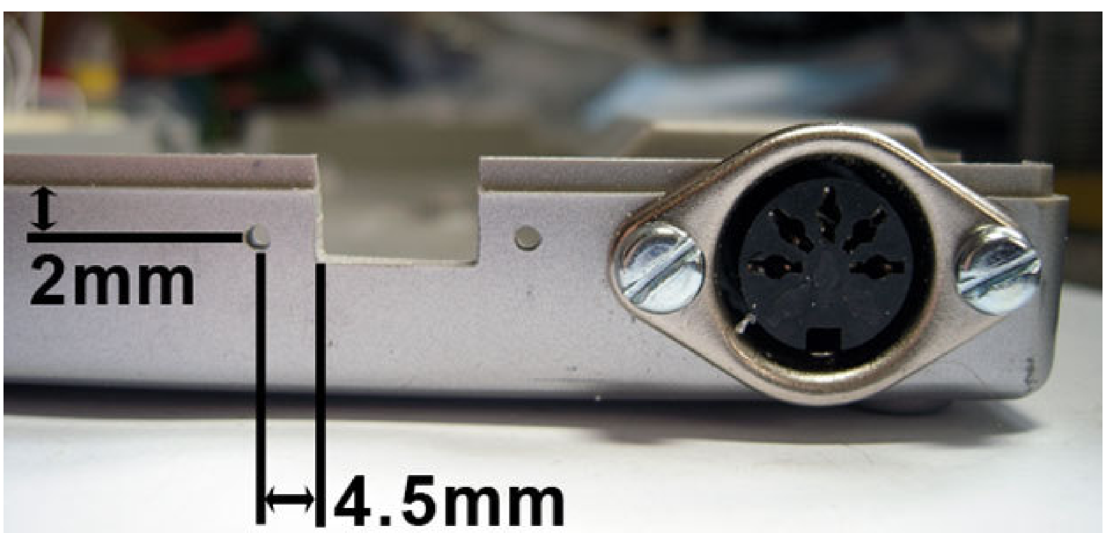


Now you need to open up the case again, and remove the voice board from the lower half of the casing. Take note that the battery terminals are soldered onto the voice board and then go through holes in the case into the battery compartment. The voice board may just pull out easily, but you might find that the battery terminals are clipped onto the plastic inside the battery compartment and need to be carefully levered off before the voice board can be removed. Once you have the voice board out you should be left with the bottom of the case with nothing in it.

You should now cut the hole for the sliding switch using the dimensions shown on the previous page. Bear in mind the 5mm measurement is from the lip of the plastic, not the top. The best way to do this is to mark it out as shown below, and then use a small hacksaw to cut down either vertical line. You can then use a sharp knife to score deeply along the horizontal line and some pliers to snap the piece of plastic out.

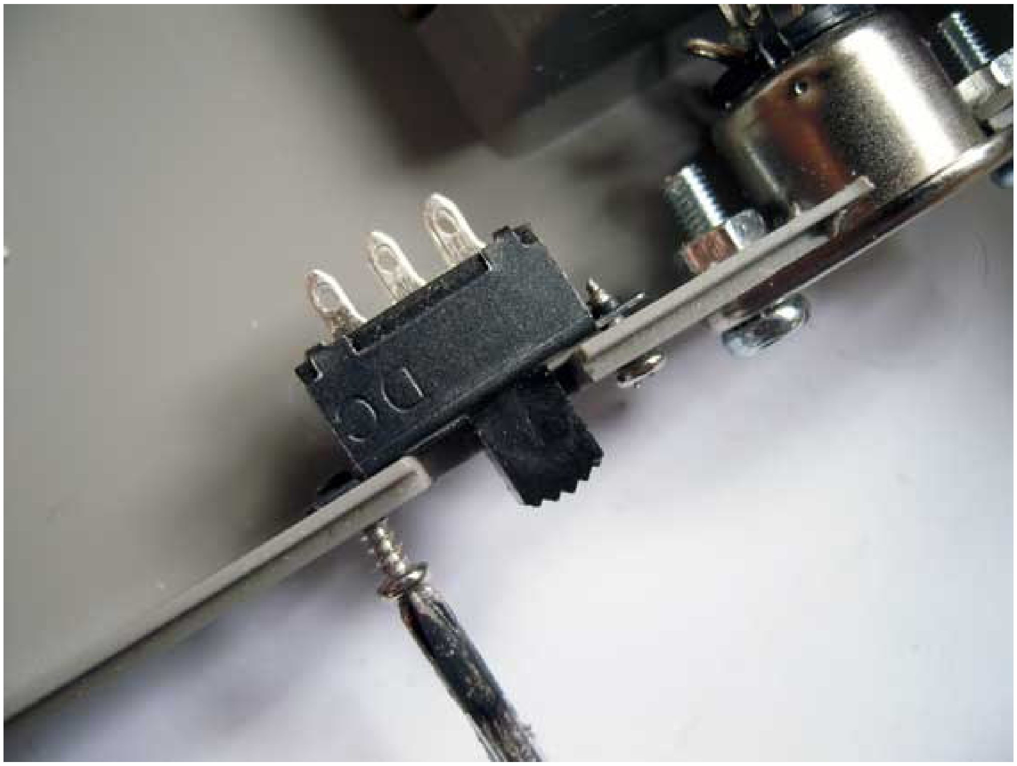


You should be left with something like this



The holes for the mounting screws can then be drilled using the dimensions above. We use a 2mm drill bit for this, but the positioning needs to be as accurate as you can make it., If you haven't cut the slot exactly 10mm wide then it might be better to measure 19mm between the screw hole centres, rather than measure in relation to the slot edge.

Use the screws to mount the sliding switch in place as shown below. The switch body should be on the inside of the casing with the screws going through the case before hitting the switch. Make sure the switch moves freely. If it rubs on the case you may need to file the slot until it moves more easily.



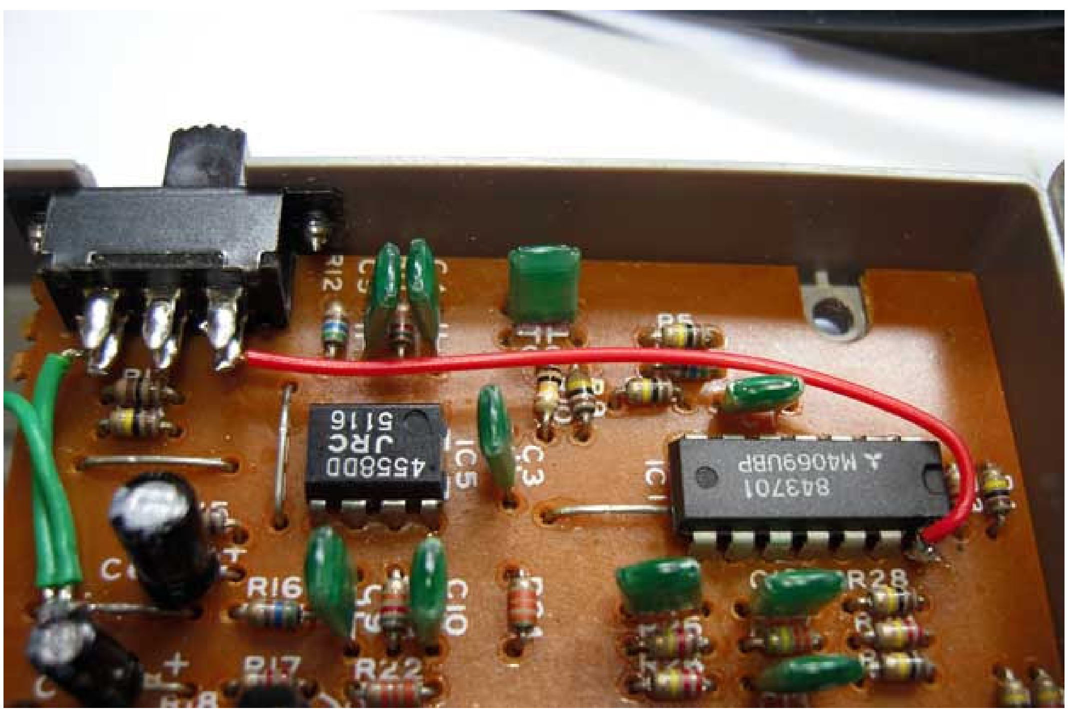
Now put the voice board back into the lower case, paying attention to slotting the battery terminals into place, and it should look something like this.



That's the most difficult part done. Next you need to do the pre-wiring before installing the interface. Firstly you should wire the bottom left pin (viewed from the rear) of the switch, and the top middle pin of the socket (called pin 2 for some reason) to a ground point. This is why you installed the socket upside down, or you'd never be able to get at this pin. The closest ground point is the jumper wire shown in the image below, just below where it says C6 on the board. Make absolutely sure you have the correct jumper or things might go up in smoke later on.

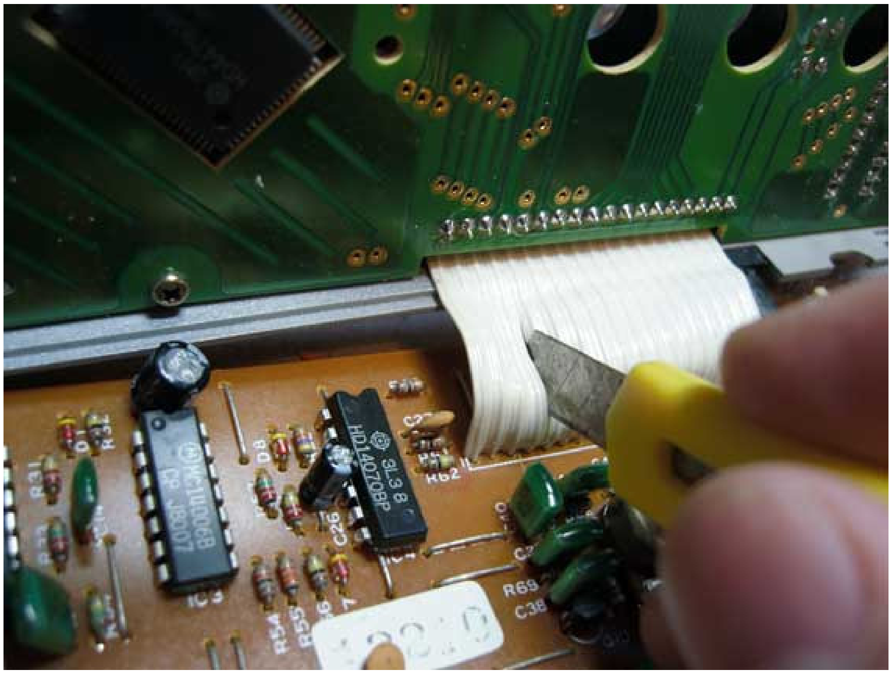


The bottom right hand pin of the switch should be soldered to a 5v source. The most convenient is pin 14 of the IC shown in the image below. Try not to overheat the IC while doing this.

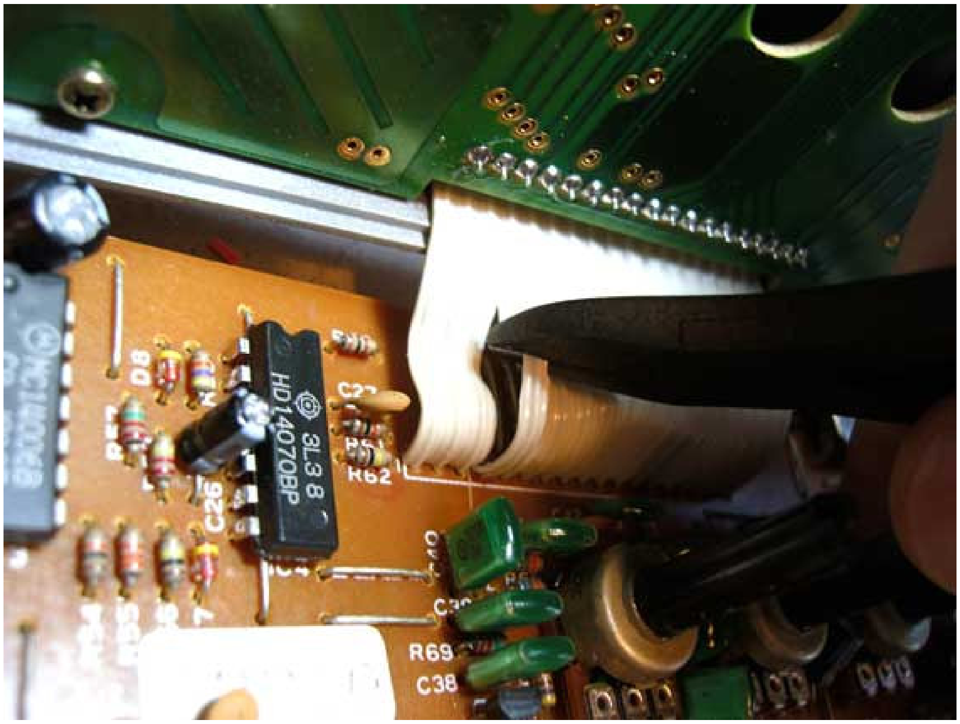


Now you need to install the clock wiring. In order to do this you first have to disconnect the standard internal clock.

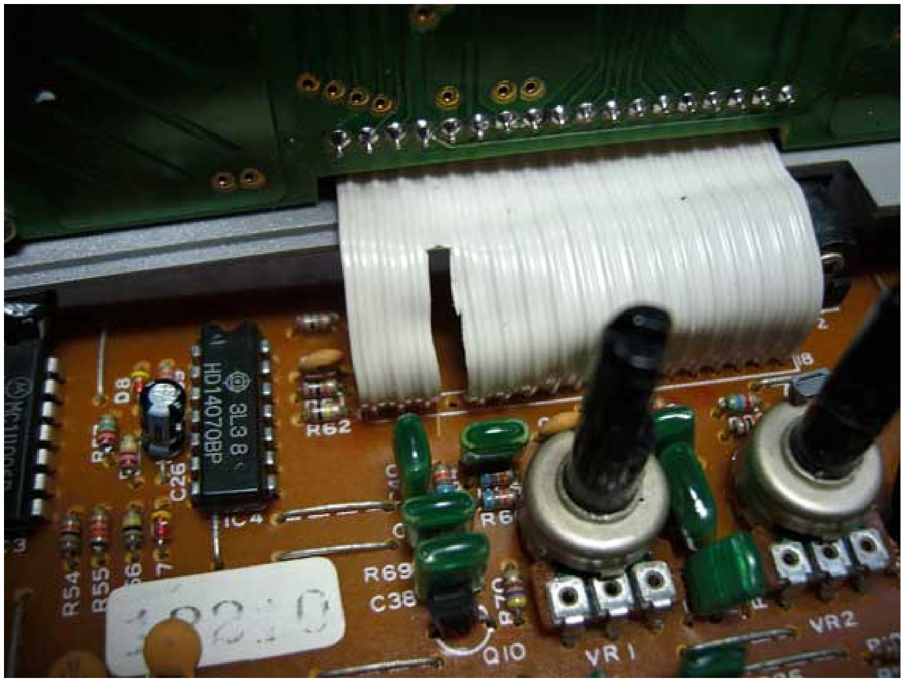
Find the white ribbon cable at the back of the case that connects the two circuit boards. You should count four wires from the left of the cable, and then use a sharp knife to cut the plastic either side of the fourth wire, as shown below.



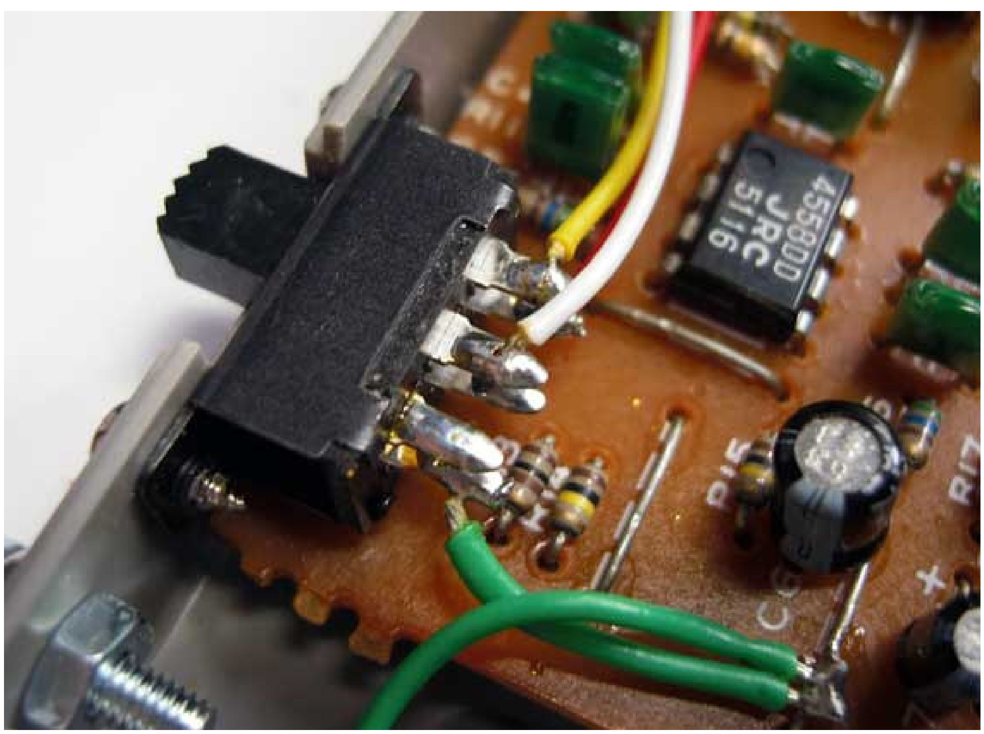
Once you have the fourth wire free of the ribbon cable on either side you can bend it outwards and use a pair of wire cutters to disconnect it.

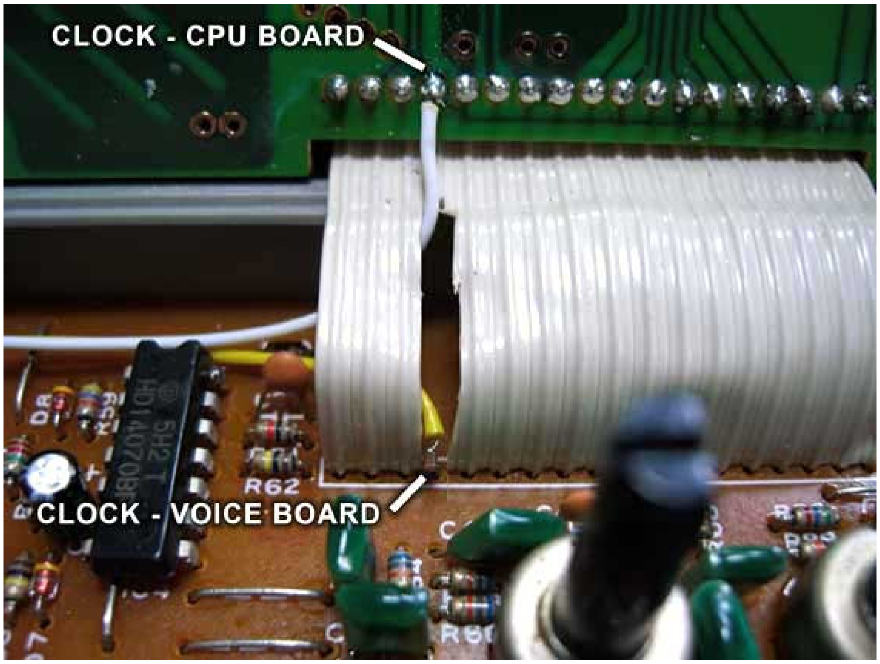


Cut out some of the remaining wire and you should be left with something like the image below. We haven't done it here, but we would recommend leaving a small length of the bare wire sticking out of the voice board as you will need to solder to it next..

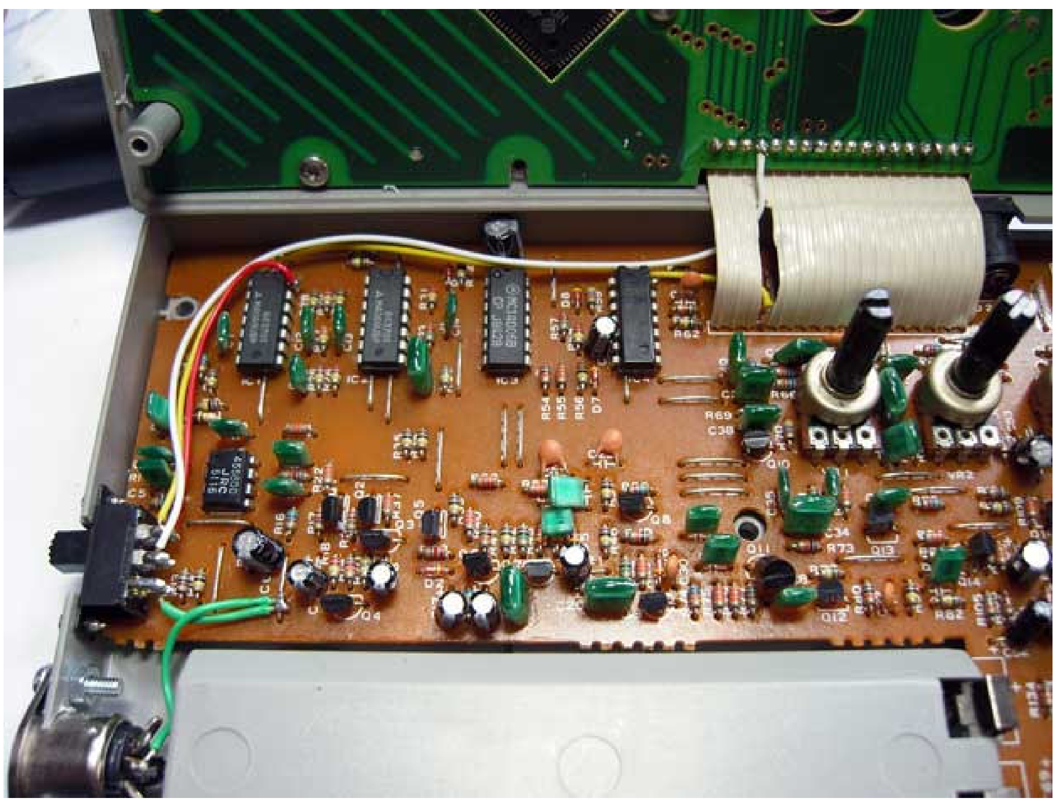


Now take a wire from the top right pin of the switch (yellow in the image below) and wire it to the point labeled 'clock - voice board' on the image on the next page. If you left a small piece of wire sticking out, this should be easy. If not stick the wire through the board and solder it on the solder side. Next take a wire from the middle top pin of the switch (white on the image below) and wire it to the point labeled 'clock – cpu board' i.e. the fourth solder point in the row.



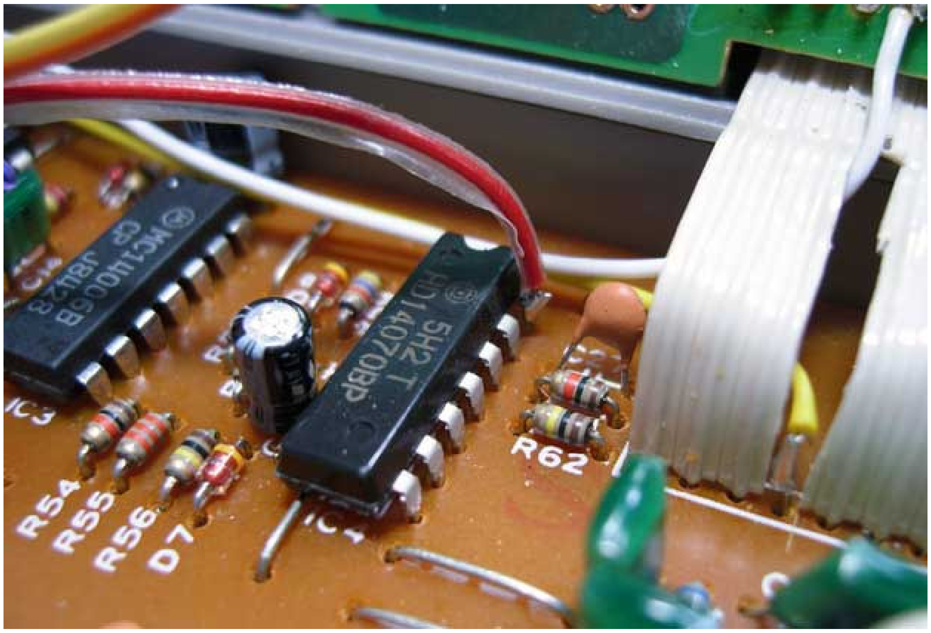


You should now have something that looks a bit like this. We're only using the different coloured wiring for clarity. It really doesn't matter what you've used at this point.

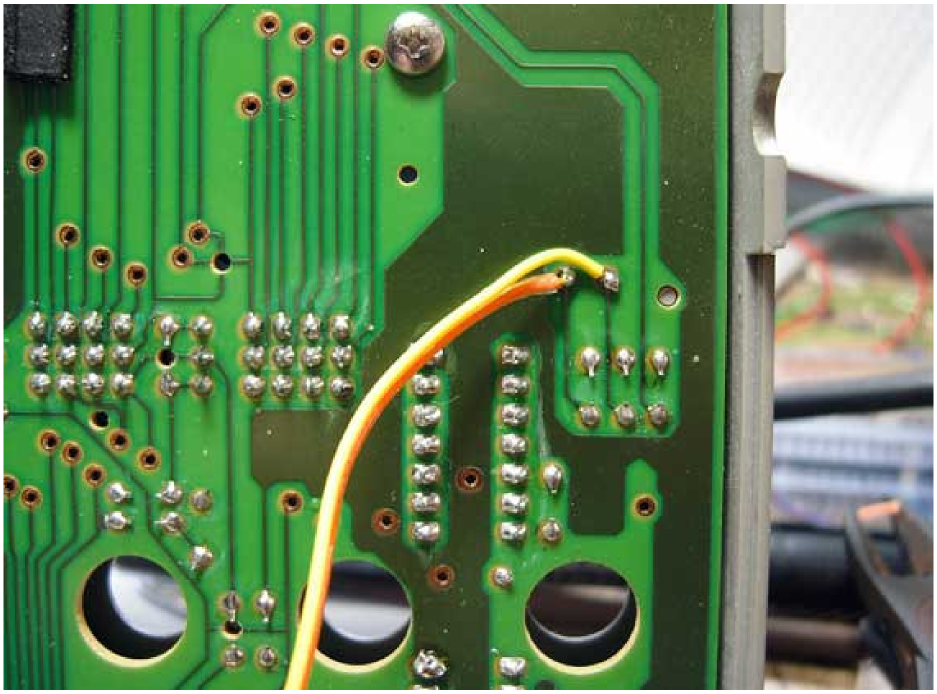


Heres where the wire colours start to matter. Find your DIN-sync interface board and place it where you want it on the voice board. Theres a nice big gap with very few components in the middle of the board but you may have to bend some capacitors out of the way. Be careful that they don’t short to other components if you do. The red, yellow and orange wire should be sticking out of the right hand side towards the tempo and volume pots etc.

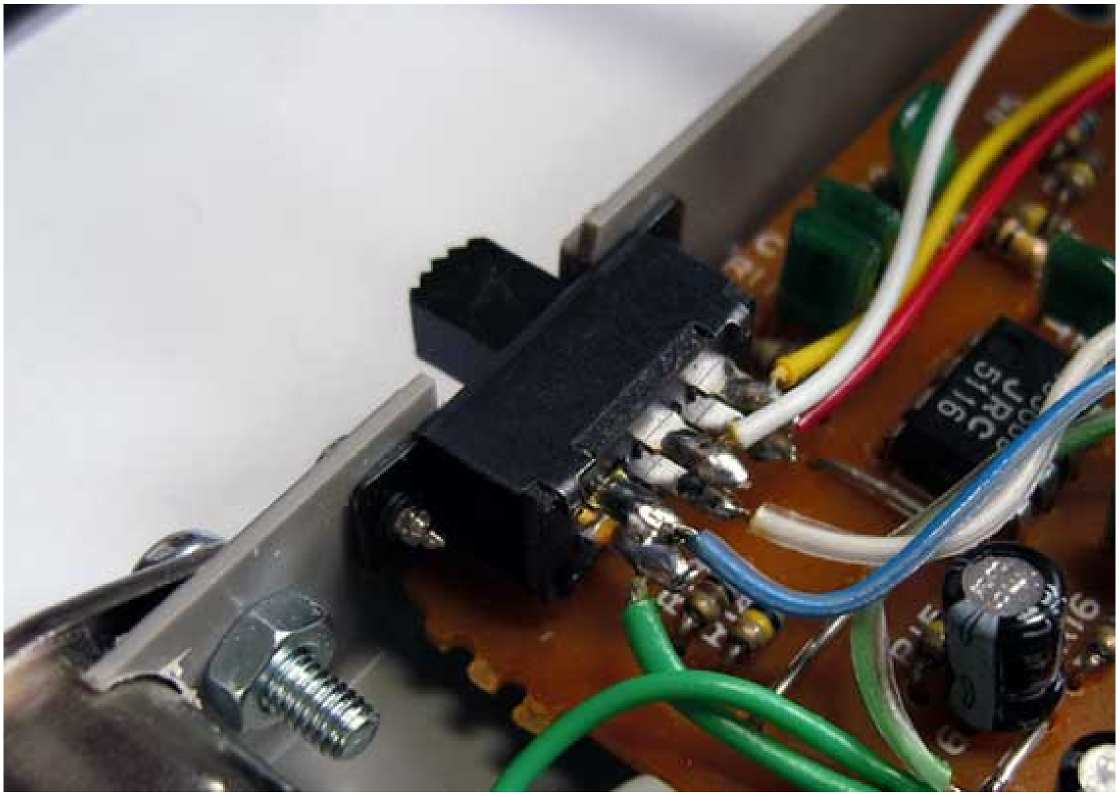
The red wire is the +5v power connection for the interface. You should peel it away from the other two wires and cut it down so it can be soldered to pin 14 of IC4. That’s the chip just to the left of the ribbon cable. This should look like the image below.



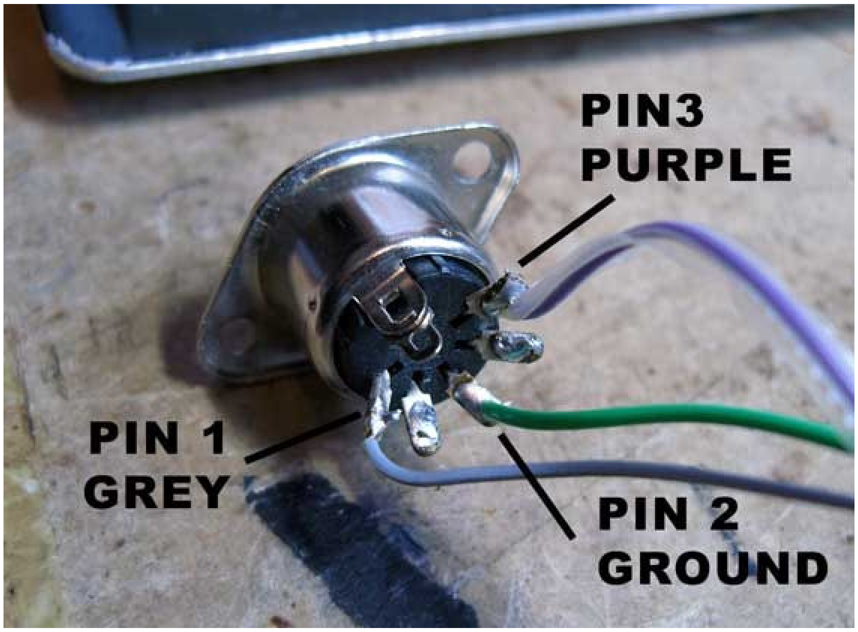
The remaining pair of orange and yellow wires are the play and stop controls and should be wired to the two points on the cpu board (in the top half of the case) as shown below. Orange solders to the left and yellow to the right.



Now solder the green wire from the left hand side of the interface, to the same ground point you used earlier i.e. the jumper next to C6. The white wire should be soldered to the bottom middle pin of the switch, while the blue wire should be soldered to the remining switch pin on the top left. See the wiring diagram at the end of the guide for more details. The switch should now look something like this.

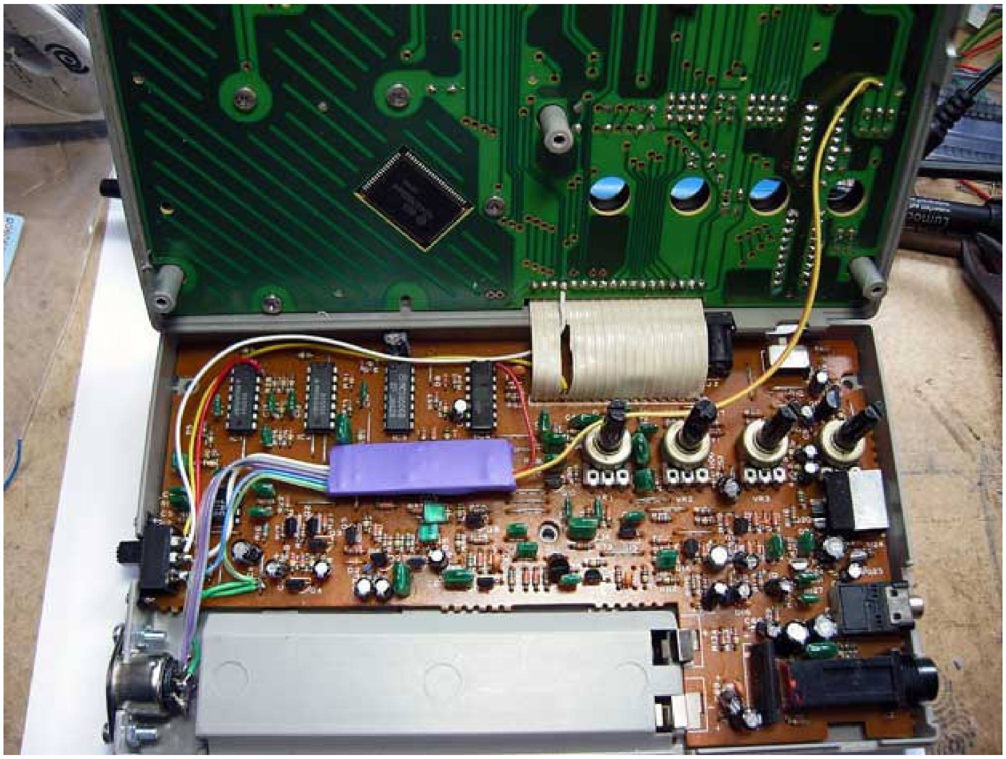


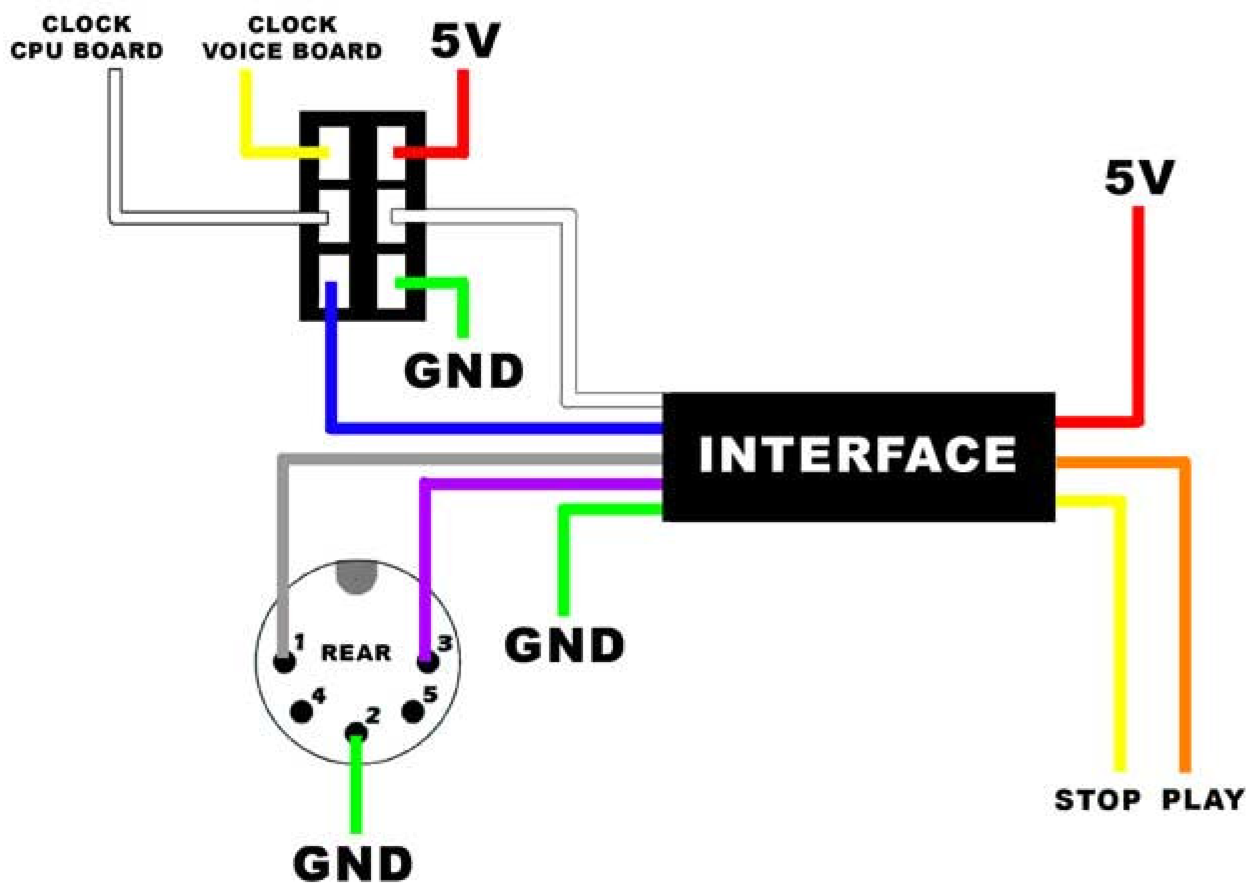
The remaining purple and grey wires should be soldered to the DIN socket as shown below. Bear in mind that your socket will be the other way up. Take note that DIN socket pin numbering does not correspond to the position of the pin, so go by the picture rather than the pin numbers.



And that's it! Check your work looks like the final images and then plug in a DIN-sync clock source. When the switch is set towards the DIN-sync socket you should have external control over the DR110. Switching it in the other direction returns the DR110 to the internal clock.






CLOCK
CPU BOARD
CLOCK
VOICE BOARD
5V
GND
5V
INTERFACE
1
REAR
3
4
5
2
GND
GND
STOP
PLAY